

THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:-

1. A fastener driving tool comprising: a tool nose through which a fastener is fired; loading means for introducing said fastener into said tool nose; said fastener being adapted to be propelled by a gas combustion mechanism, wherein said gas combustion mechanism comprises a first priming cylinder having a first piston and an air intake fluidally connected via a first valve means to a second delivery cylinder having a second piston, said first priming cylinder fluidally connected to a fuel gas reservoir via a second valve means, said first priming cylinder adapted to receive fuel gas from said fuel gas reservoir and air through said air intake thereby forming an air/fuel gas mixture therein, said first piston adapted to compress said air/fuel gas mixture and transfer said air/fuel gas mixture to said second delivery cylinder via said first valve means, said air/fuel mixture ignited therein and thereby urging said second piston towards said fastener and propelling the same away from said tool nose.
2. A fastener driving tool as claimed in claim 1, wherein said first piston is mechanically actuated.
3. A fastener driving tool as claimed in claim 1 or 2, wherein said second valve means is opened and closed via mechanical actuation.
4. A fastener driving tool as claimed in claim 1, wherein said first piston is electromagnetically actuated.
5. A fastener driving tool as claimed in claim 1 or 4, wherein said second valve means is opened and closed via electro-magnetic actuation.
6. A fastener driving tool as claimed in claim 1, wherein said fastener driving tool is a nail gun.

7. A fastener driving tool as claimed in claim 1, wherein a mechanism movable between a first and a second position along said tool nose includes a latching means for engaging said second position, such that said air/fuel gas mixture is further compressed by said second piston as said mechanism is moved from said first to said second position with said latching means engaged and wherein the downward force from the ignition of said air/fuel mixture overcomes said latching means and urges said second piston towards said fastener.
8. A fastener driving tool as claimed in claim 1, wherein a bumper is disposed near the bottom of said second delivery cylinder, such bumper adapted to be compressed by said second piston in the bottom of its travel and wherein the subsequent restoration of said bumper is further adapted to forcibly return said second piston back up said second delivery cylinder.
9. A fastener driving tool as claimed in claim 8, wherein the interior of said bumper forms a chamber adapted to port pressurised air via an outlet valve through a transfer channel to said first priming cylinder as said bumper is compressed.
10. A fastener driving tool as claimed in claim 9, wherein said first piston has an internal receiver for storing said pressurised air.
11. A fastener driving tool as claimed in claim 1, wherein a sealing ring having a semi-flexible lip is disposed around the periphery of said second piston.
12. A fastener driving tool as claimed in claim 1, wherein a mixing fan is rotatably mounted to the interior of said second delivery cylinder.
13. A fastener driving tool as claimed in claim 12, wherein an externally mounted motor drives said mixing fan via magnetic coupling.

14. A fastener driving tool as claimed in claim 1, wherein said second delivery cylinder is exhausted via a plate valve that fluidly connects said second delivery cylinder with an exhaust plenum when said plate valve is opened.
15. An apparatus utilising a gas combustion mechanism for propulsion of an object, said gas combustion mechanism comprises a first priming cylinder having a first piston and an air intake fluidally connected via a first valve means to a second delivery cylinder having a second piston, said first priming cylinder fluidally connected to a fuel gas reservoir via a second valve means, said first priming cylinder adapted to receive fuel gas from said fuel gas reservoir and air through said air intake thereby forming an air/fuel gas mixture therein, said first piston adapted to compress said air/fuel gas mixture and transfer said air/fuel gas mixture to said second delivery cylinder via said first valve means, said air/fuel mixture ignited therein and thereby urging said second piston towards said object thereby propelling the same.